



# Regulatory Announcement

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## Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements

*The U.S. Environmental Protection Agency (EPA) is establishing a comprehensive national control program that will regulate the heavy-duty vehicle and its fuel as a single system. As part of this program, new emission standards will begin to take effect in model year 2007 and will apply to heavy-duty highway engines and vehicles. These standards are based on the use of high-efficiency catalytic exhaust emission control devices or comparably effective advanced technologies.*

*Because these devices are damaged by sulfur, we are also reducing the level of sulfur in highway diesel fuel by 97 percent by mid-2006. The program provides substantial flexibility for refiners, especially small refiners, and for manufacturers of engines and vehicles, to aid them in implementing the new requirements in the most cost-efficient manner.*

### **Background**

The pollution emitted by diesel engines contributes greatly to our nation's continuing air quality problems. Even with more stringent heavy-duty highway engine standards set to take effect in 2004, these engines will continue to emit large amounts of oxides of nitrogen (NO<sub>x</sub>) and particulate matter (PM), both of which contribute to serious public health problems in the United States. Exposure is widespread, particularly in urban areas.

Diesel exhaust or diesel particulate matter (soot) is likely to cause lung cancer in humans. Other health effects include aggravation of respiratory and cardiovascular disease, aggravation of existing asthma, acute respiratory symptoms, chronic bronchitis and decreased lung function.

Heavy-duty trucks and buses today account for about one-third of NOx emissions and one-quarter of PM emissions from mobile sources. In some urban areas, the contribution is even greater. EPA's

new program will result in PM and NOx emission levels that are 90 percent and 95 percent below today's levels, respectively.

The results of this historic program are comparable to the advent of the catalytic converter on cars, as the standards will for the first time result in the widespread introduction of exhaust emission control devices on diesel engines. And, just as removing lead from gasoline enables the use of catalytic converters, this program removes sulfur from diesel fuel to enable the use of these advanced emission controls on diesel vehicles.

### **New Standards for Heavy-Duty Highway Engines and Vehicles**

We are finalizing a PM emissions standard for new heavy-duty engines of 0.01 grams per brake-horsepower-hour (g/bhp-hr), to take full effect for diesels in the 2007



model year. We are also finalizing standards for NOx and non-methane hydrocarbons (NMHC) of 0.20 g/bhp-hr and 0.14 g/bhp-hr, respectively. These NOx and NMHC standards will be phased in together between 2007 and 2010, for diesel engines. The phase-in will be on a percent-

of-sales basis: 50 percent from 2007 to 2009 and 100 percent in 2010.

Gasoline engines will be subject to these standards based on a phase-in requiring 50 percent compliance in the 2008

model year and 100 percent compliance in the 2009 model year.

The program includes flexibility provisions to facilitate the transition to the new standards and to encourage the early introduction of clean technologies, and adjustments to various testing and compliance requirements to address differences between the new technologies and existing engine-based technologies.

### **New Standards for Diesel Fuel**

Refiners will be required to start producing diesel fuel for use in highway vehicles with a sulfur content of no more than 15 parts per million (ppm), beginning June 1, 2006. At the terminal level, highway diesel fuel sold as low sulfur fuel will be required to meet the 15 ppm sulfur standard as of July 15, 2006. For retail stations and fleets, highway diesel fuel sold as low sulfur fuel

must meet the 15 ppm sulfur standard by September 1, 2006.

This program includes a combination of flexibilities available to refiners to ensure a smooth transition to low sulfur highway diesel fuel. Refiners can take advantage of a temporary compliance option, including an averaging, banking and trading component, beginning in June 2006 and lasting through 2009, with credit given for early compliance before June 2006. Under this option, up to 20 percent of highway diesel fuel may continue to be produced at the existing 500 ppm sulfur maximum standard, though it must be segregated from 15 ppm fuel in the distribution system, and may only be used in pre-2007 model year heavy-duty vehicles.



We are providing additional hardship provisions for small refiners to minimize their economic burden in complying with the 15 ppm sulfur standard and giving additional flexibility to refiners subject to the Geographic Phase-in Area (GPA) provisions of the Tier 2 gasoline sulfur program, which will allow them the option of staggering their gasoline and diesel investments. We are also adopting a general

hardship provision for which any refiner may apply on a case-by-case basis under certain conditions.

## Health and Environmental Benefits

Without significant new controls on motor vehicle emissions, millions of Americans will continue to breathe unhealthy air. The new standards will result in substantial benefits to the public health and welfare through significant annual reductions in emissions of NO<sub>x</sub>, PM, NMHC, carbon monoxide, sulfur dioxide, and air toxics. The clean air impact of this program will be dramatic when fully implemented. These emission reductions will prevent 8,300 premature deaths, more than 9,500 hospitalizations, and 1.5 million work days lost.

As a result of this program, each new truck and bus will be more than 90 percent cleaner than current models. The clean air impact of this program will be dramatic when fully implemented. This program will provide annual emission reductions equivalent to removing

the pollution from more than 90 percent of today's trucks and buses, or about 13 million trucks and buses.

We project a 2.6 million ton reduction of NO<sub>x</sub> emissions in 2030 when the current heavy-duty vehicle fleet is completely replaced with newer heavy-duty vehicles that comply with these emission standards. By 2030, this program will reduce annual emissions of NMHC by 115,000 tons and

PM by 109,000 tons. These emissions reductions are on par with those for passenger vehicles and low sulfur gasoline under the Tier 2 program.

Ozone causes a range of health problems related to breathing, including chest pain, coughing, and shortness of breath. PM is deposited deep in the lungs and causes premature death, increased emergency room visits, and increased respiratory symptoms and disease. With both ozone and PM, children and the elderly are most at risk. In addition, ozone, NO<sub>x</sub>, and PM adversely affect the environment in various ways, including crop damage, acid rain, and visibility impairment.

### **Costs of the Program**

We project that the emission reductions and the resulting significant public health and environmental benefits of this program will come at an average cost increase of about \$1,200 to \$1,900 per new vehicle, depending on the vehicle size. To put this in perspective, new vehicle prices today can range from as much as \$150,000 for a new heavy-duty truck to \$250,000 for a new bus. We estimate that when fully implemented, the sulfur reduction requirement will increase the cost of producing and distributing diesel fuel by about 4-1/2 to 5 cents per gallon.

### **For More Information**

You can access the final rule and related documents electronically on the Office of Transportation and Air Quality (OTAQ) Web site at:

<http://www.epa.gov/otaq/diesel.htm>

You can also contact the OTAQ Library for document information at:

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